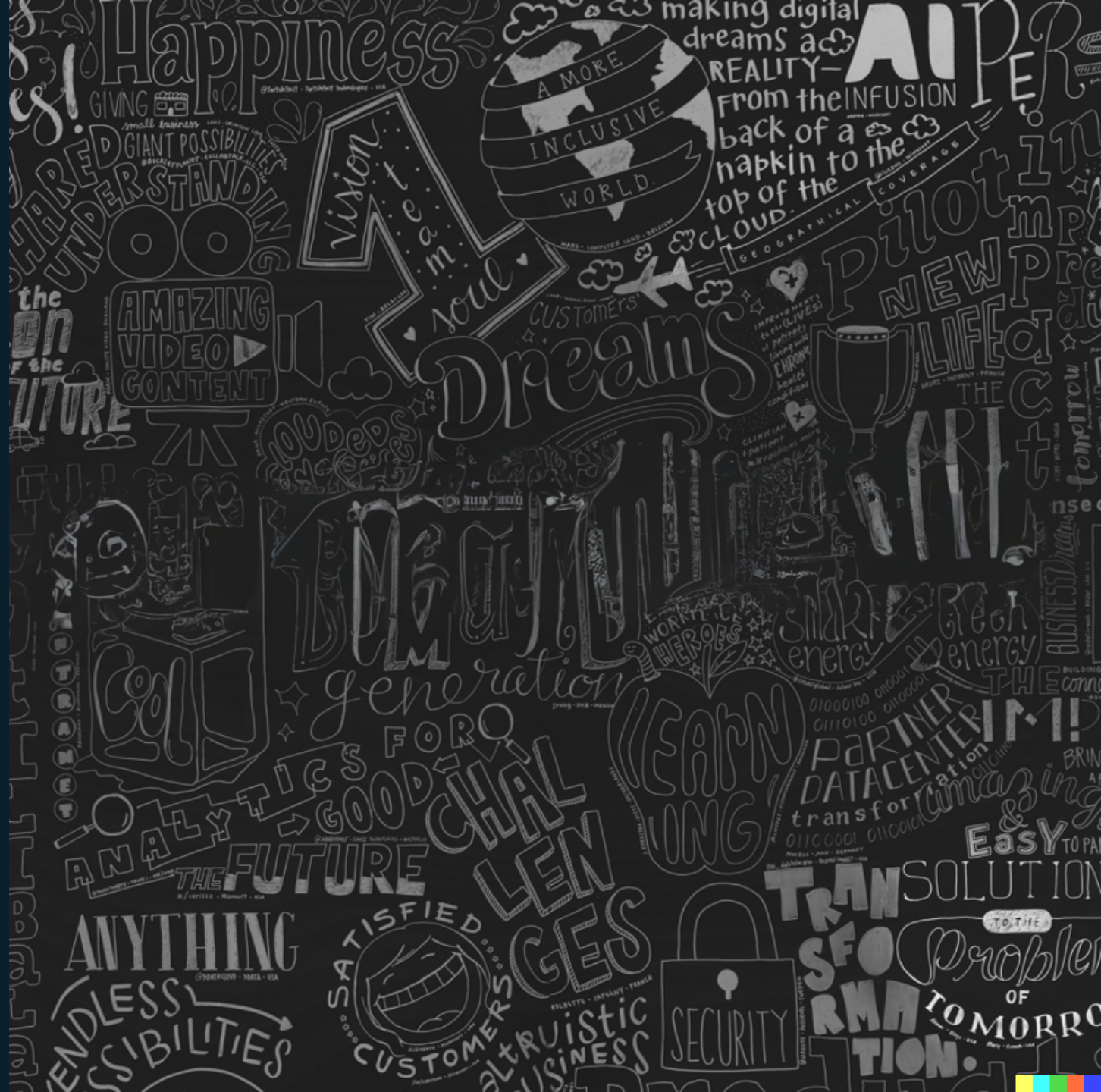
Expanding Accessibility with AI

Aaron Gustafson

Ioana Tanase



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What does AI have to do with accessibility?

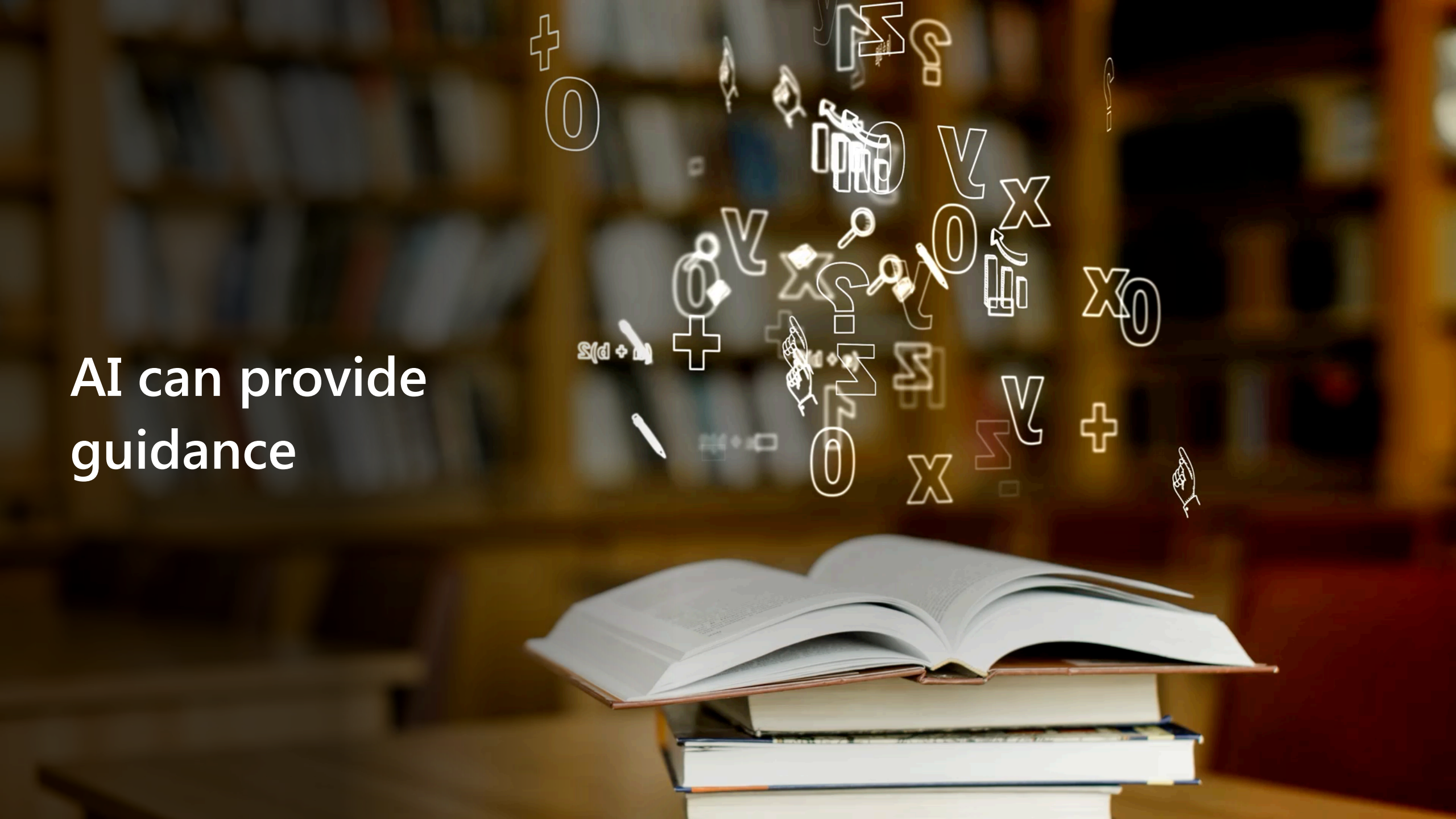
Disability is the gap between the world as we've designed it and an individual's ability to navigate that world. AI can both bridge and narrow that gap.

The promise of AI is the capacity to amplify human capability.

* It can also amplify our worst biases & behaviors, which Ioana will talk about.


AI is excellent at
repetitive tasks.

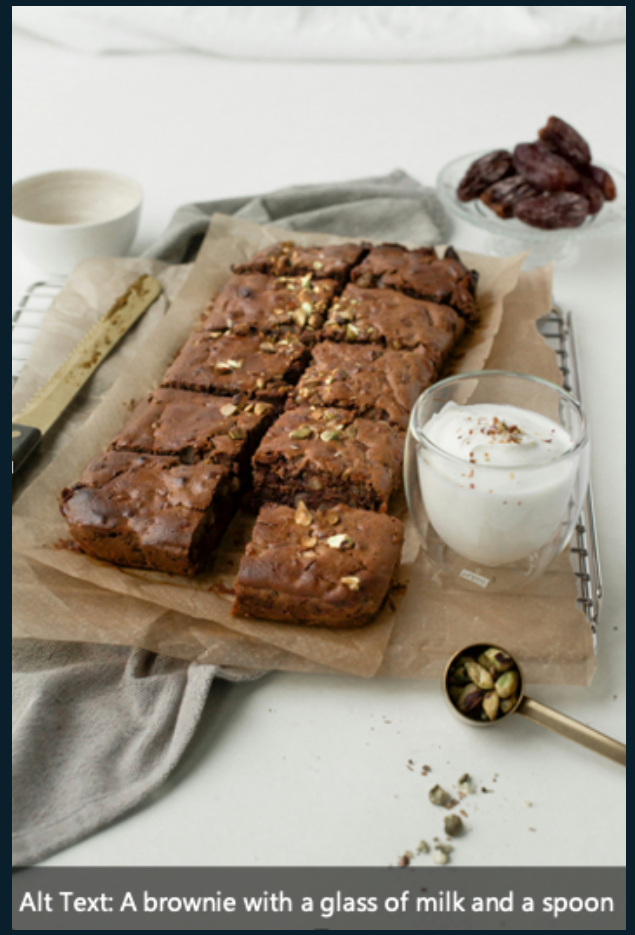
AI can provide guidance



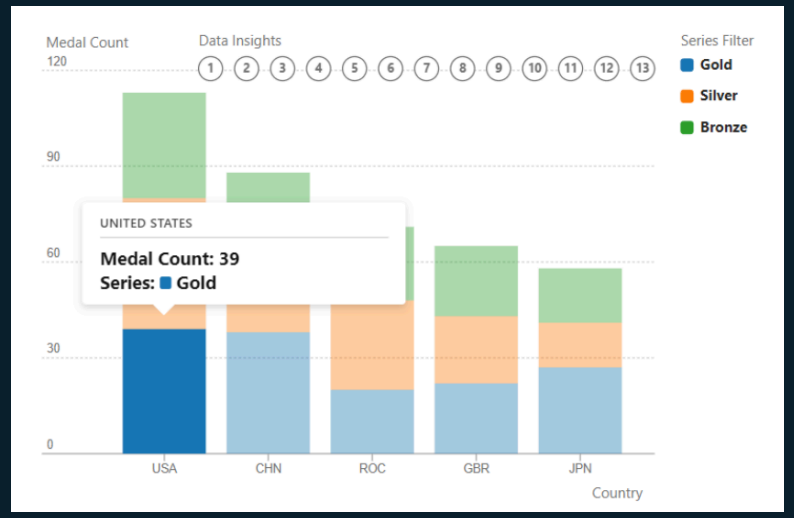

AI enables people
with disabilities to
empower themselves
on their own terms

Use Case: Improved Descriptions

Images



Charts

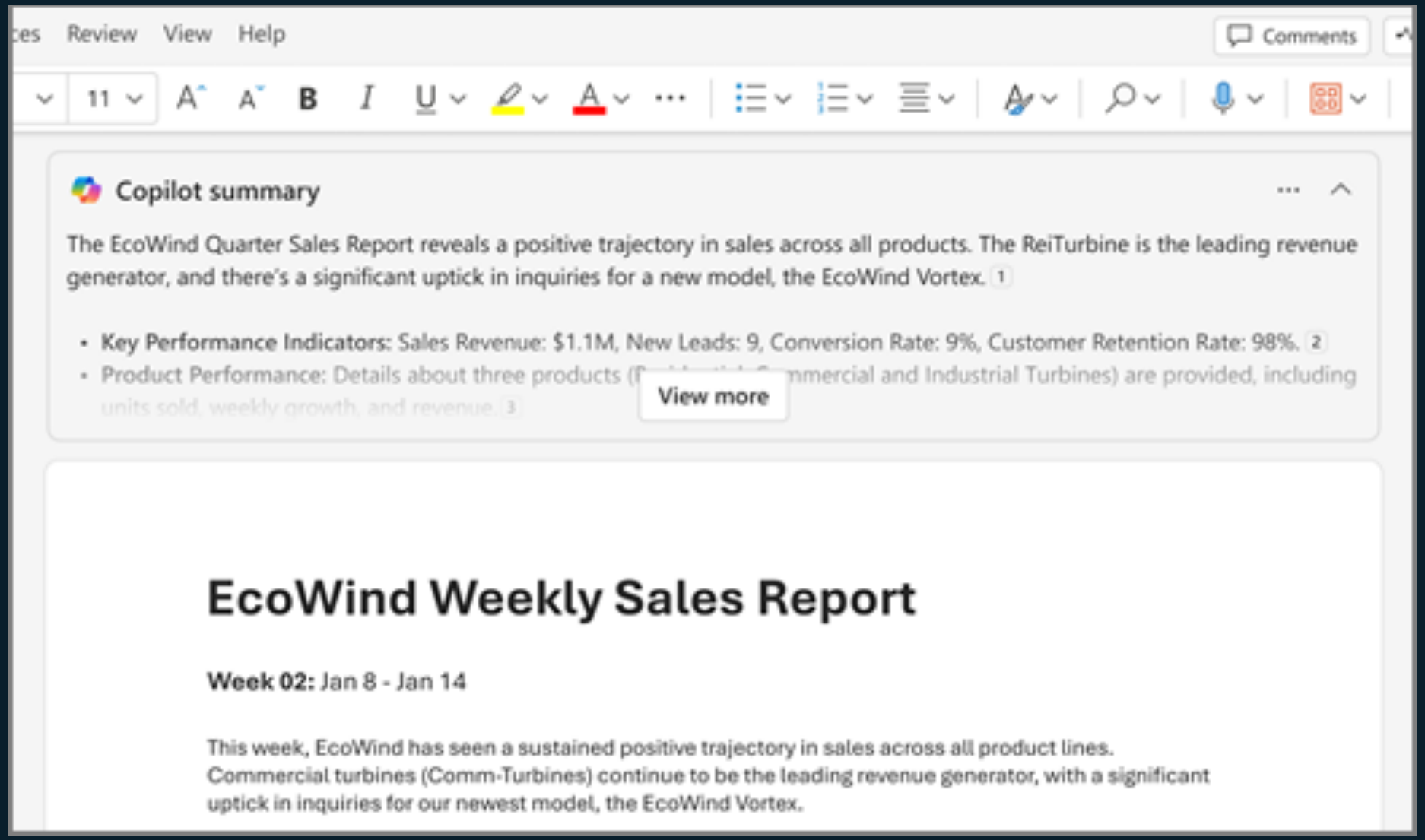


"the United States has the highest total number of medals, followed by China, Russia, and Great Britain. Japan has the lowest total number of medals. Of the Gold medals, the US has the highest number of medals and Russia has the lowest..."

Our World


THE
PROMPT
Presented by
Microsoft

Use Case: Adaptive Content



Use Case: Adaptive Content

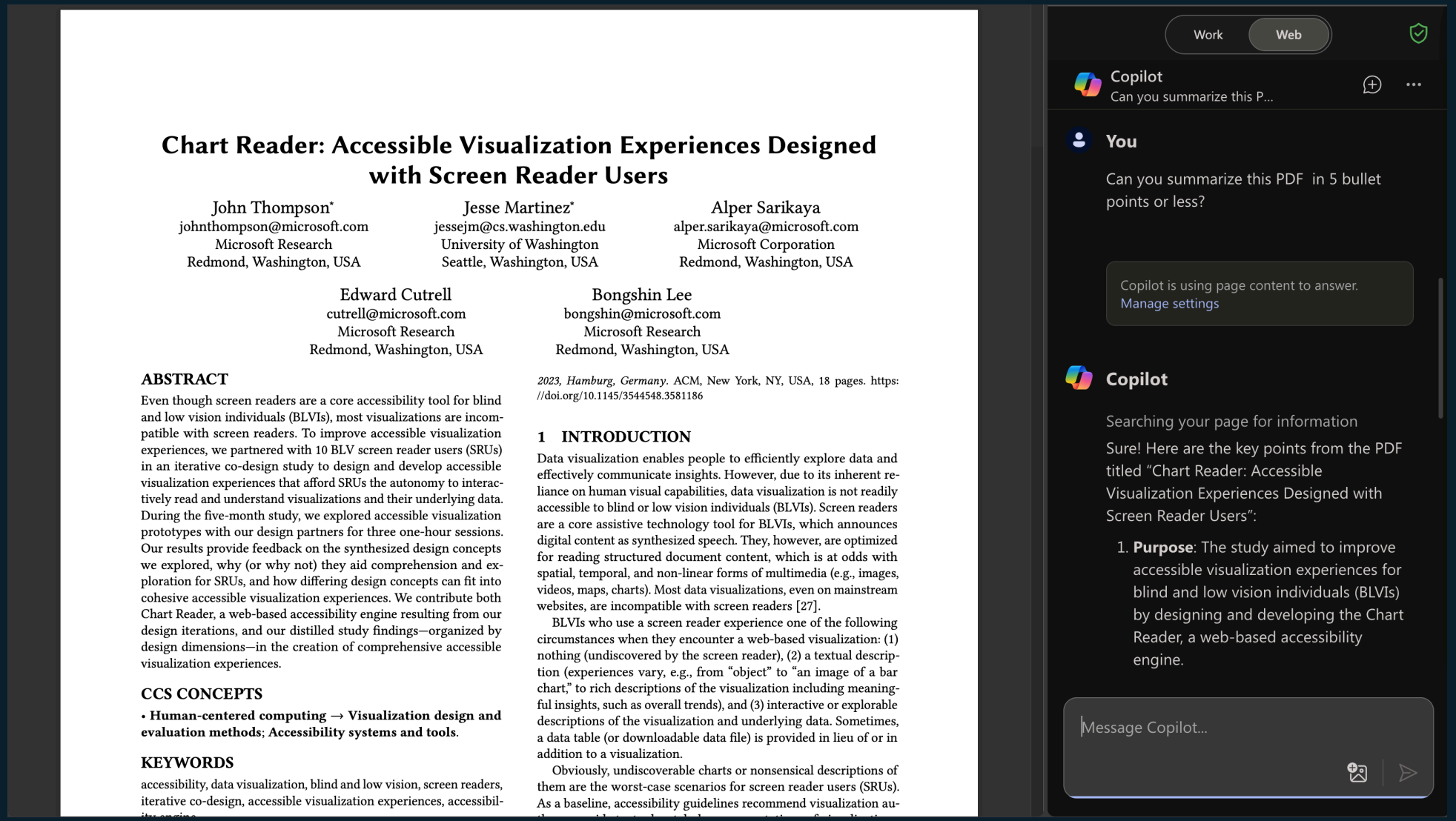


Chart Reader: Accessible Visualization Experiences Designed with Screen Reader Users

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ABSTRACT

Even though screen readers are a core accessibility tool for blind and low vision individuals (BLVIs), most visualizations are incompatible with screen readers. To improve accessible visualization experiences, we partnered with 10 BLV screen reader users (SRUs) in an iterative co-design study to design and develop accessible visualization experiences that afford SRUs the autonomy to interactively read and understand visualizations and their underlying data. During the five-month study, we explored accessible visualization prototypes with our design partners for three one-hour sessions. Our results provide feedback on the synthesized design concepts we explored, why (or why not) they aid comprehension and exploration for SRUs, and how differing design concepts can fit into cohesive accessible visualization experiences. We contribute both Chart Reader, a web-based accessibility engine resulting from our design iterations, and our distilled study findings—organized by design dimensions—in the creation of comprehensive accessible visualization experiences.

CCS CONCEPTS

• **Human-centered computing** → **Visualization design and evaluation methods**; **Accessibility systems and tools**.

KEYWORDS

accessibility, data visualization, blind and low vision, screen readers, iterative co-design, accessible visualization experiences, accessibil-

2023, Hamburg, Germany. ACM, New York, NY, USA, 18 pages. https://doi.org/10.1145/3544548.3581186

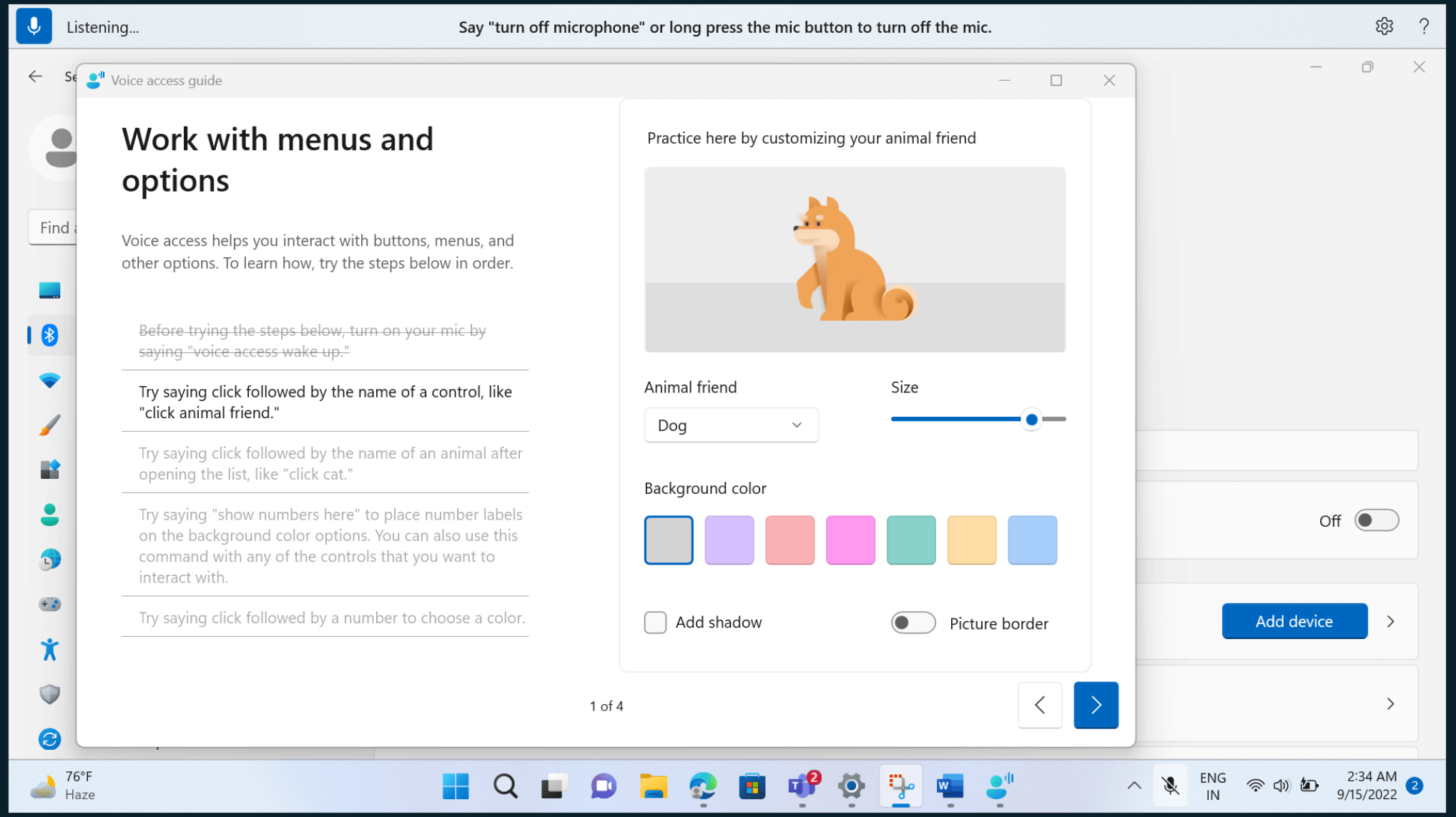
1 INTRODUCTION

Data visualization enables people to efficiently explore data and effectively communicate insights. However, due to its inherent reliance on human visual capabilities, data visualization is not readily accessible to blind or low vision individuals (BLVIs). Screen readers are a core assistive technology tool for BLVIs, which announces digital content as synthesized speech. They, however, are optimized for reading structured document content, which is at odds with spatial, temporal, and non-linear forms of multimedia (e.g., images, videos, maps, charts). Most data visualizations, even on mainstream websites, are incompatible with screen readers [27].

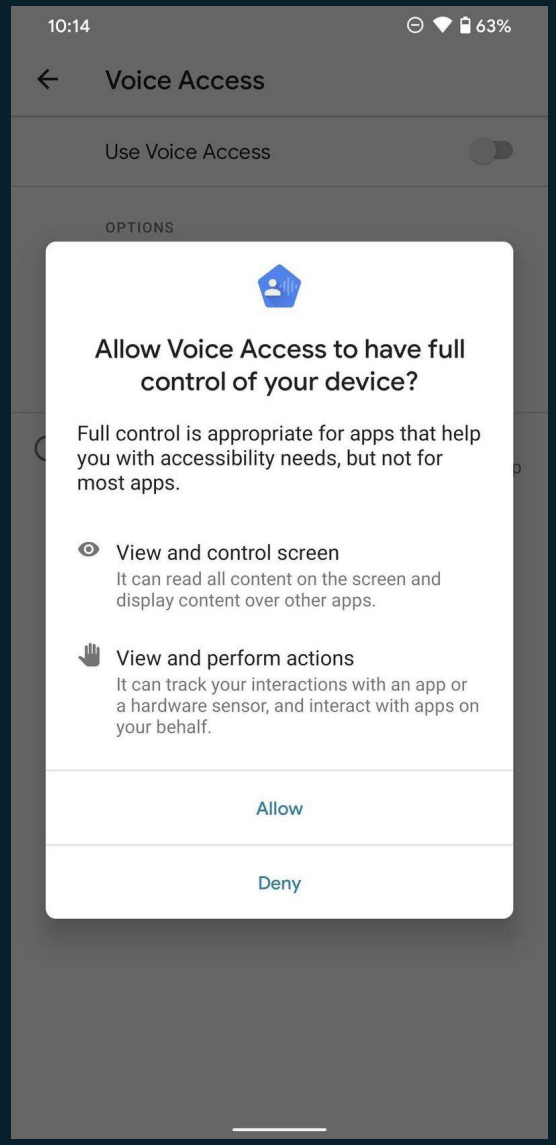
BLVIs who use a screen reader experience one of the following circumstances when they encounter a web-based visualization: (1) nothing (undiscovered by the screen reader), (2) a textual description (experiences vary, e.g., from "object" to "an image of a bar chart," to rich descriptions of the visualization including meaningful insights, such as overall trends), and (3) interactive or explorable descriptions of the visualization and underlying data. Sometimes, a data table (or downloadable data file) is provided in lieu of or in addition to a visualization.

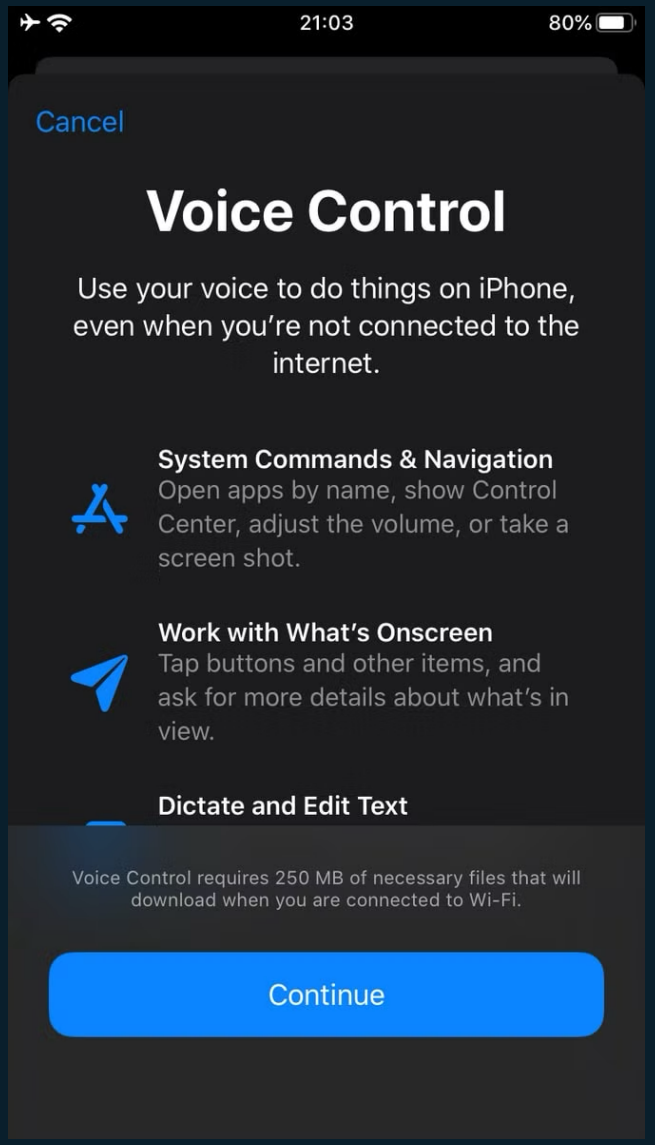
Obviously, undiscoverable charts or nonsensical descriptions of them are the worst-case scenarios for screen reader users (SRUs). As a baseline, accessibility guidelines recommend visualization au-

Use Case: Adaptive Input



Use Case: Adaptive Input



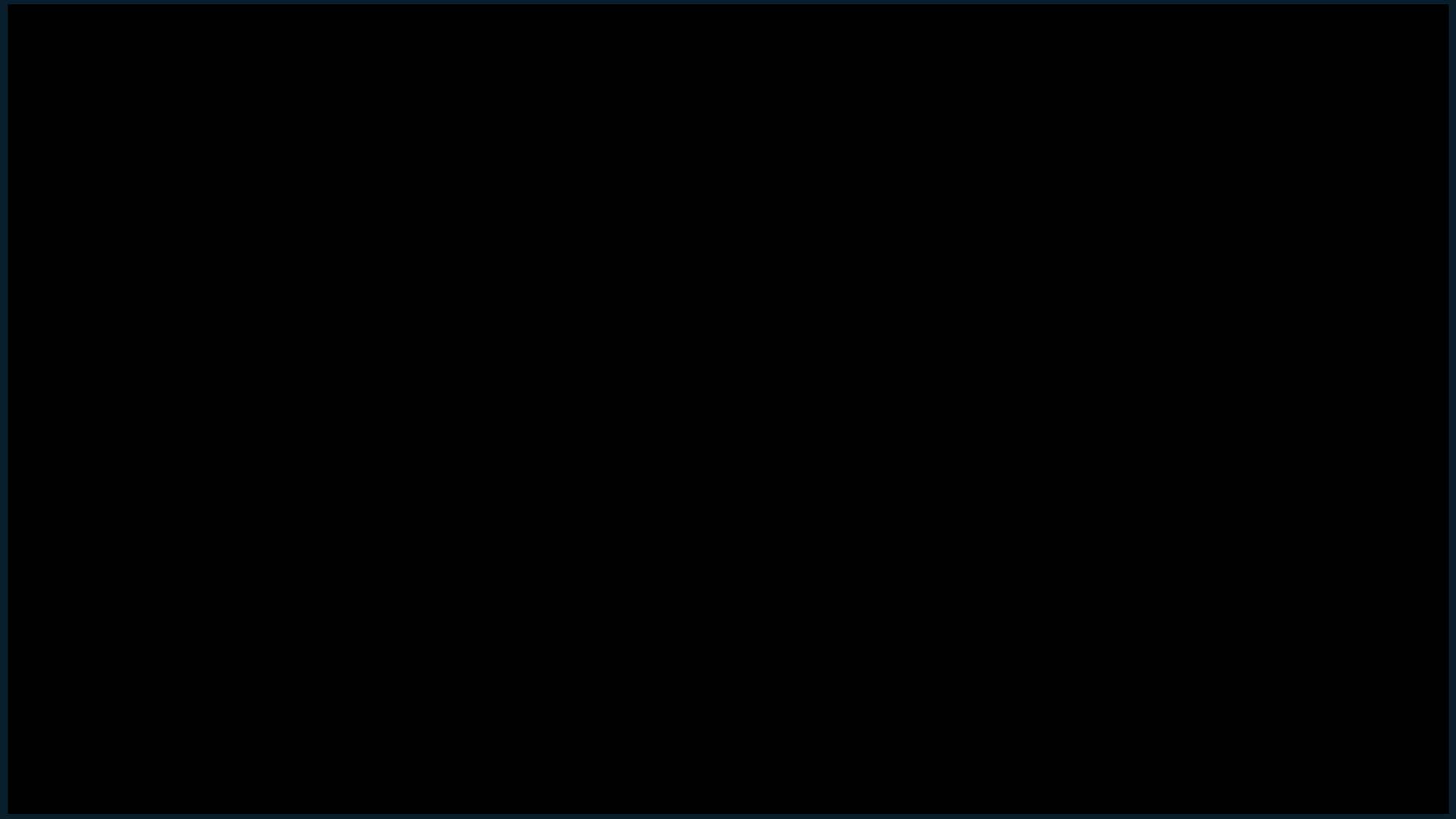


Use Case: Adaptive Input

Coming together to expand voice recognition

The University of Illinois Urbana-Champaign has announced the Speech Accessibility Project, a new research initiative to make voice recognition technology more useful for people with a range of diverse speech patterns and disabilities.

Use Case: Adaptive Input



Use Case: Improved Communication

"The less I type, the better": How AI Language Models can Enhance or Impede Communication for AAC Users

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ABSTRACT

Users of augmentative and alternative communication (AAC) devices sometimes find it difficult to communicate in real time with others due to the time it takes to compose messages. AI technologies such as large language models (LLMs) provide an opportunity to support AAC users by improving the quality and variety of text suggestions. However, these technologies may fundamentally change how users interact with AAC devices as users transition from typing their own phrases to prompting and selecting AI-generated phrases. We conducted a study in which 12 AAC users tested live suggestions from a language model across three usage scenarios: extending short replies, answering biographical questions, and requesting assistance. Our study participants believed that AI-generated phrases could save time, physical and cognitive effort when communicating, but felt it was important that these phrases reflect their own communication style and preferences. This work identifies opportunities and challenges for future AI-enhanced AAC devices.

KEYWORDS

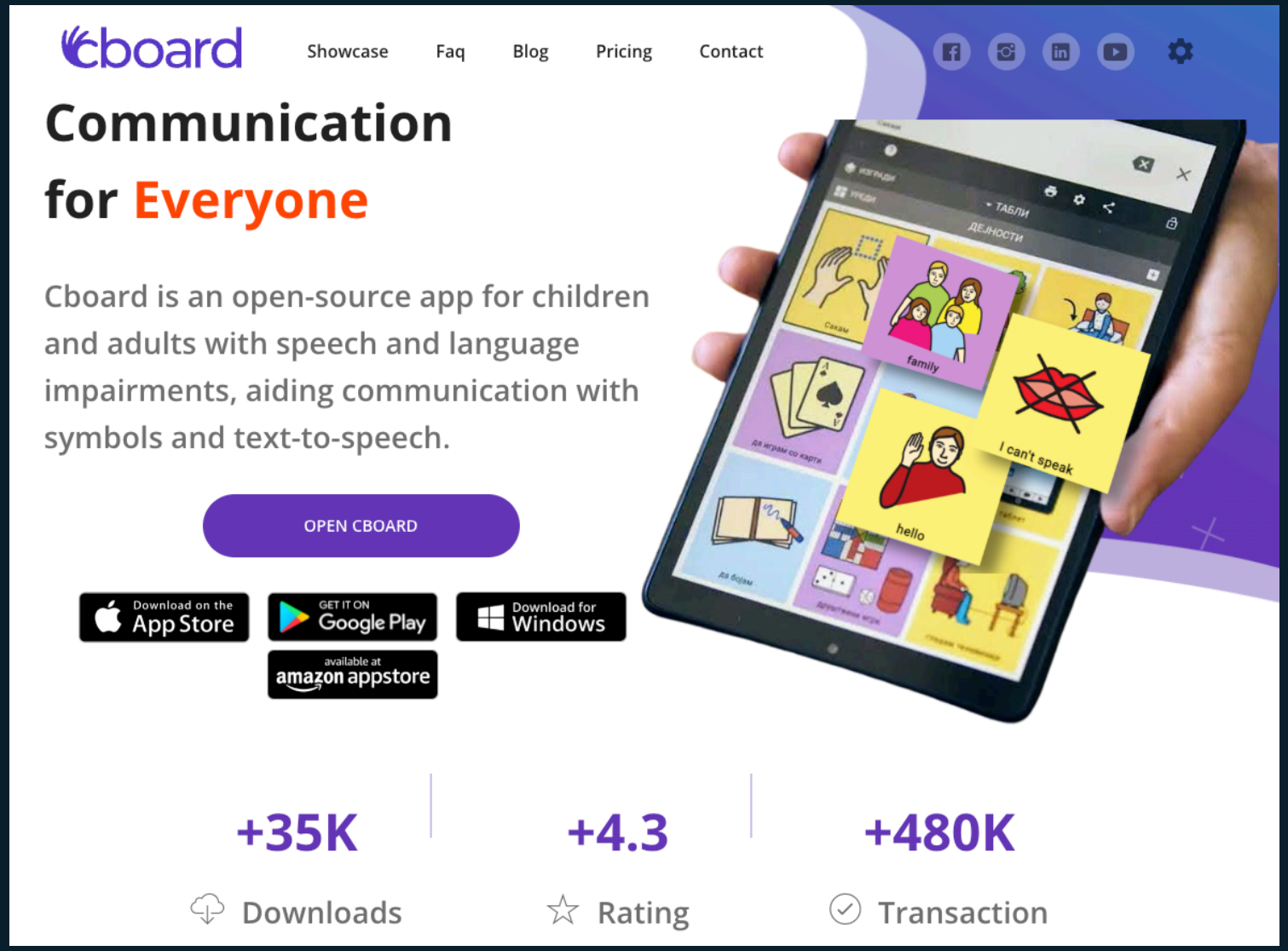
accessibility, communication, artificial intelligence, large language

with a wide variety of abilities and disabilities may use AAC devices to assist with communication. Given the variety of AAC users, AAC devices themselves often vary in their use: users may interact with the device through gaze, touch, or with a physical switch; users may select words through menus, by typing them with a keyboard, or with some combination of the two; AAC output may be read aloud, shared as text, or stored for later use [2].

While AAC users and devices may vary, there are some general challenges that affect many AAC users. For example, AAC users often communicate more slowly than non-AAC users [30]. As a result, they may feel pressure to respond in time or struggle to participate in a conversation. Some AAC users report that using an AAC device requires high physical and cognitive effort, which impacts AAC users' ability to effectively express themselves [16, 20]. Much research around AAC focuses on the goals of reducing the effort of AAC input and increasing the speed of AAC composition.

A primary strategy for improving AAC performance is to predict what the user intends to type and offer it as a suggestion [34]. These predictions can come from many sources, including static language models [34], photographs [12, 13], or contextual information about

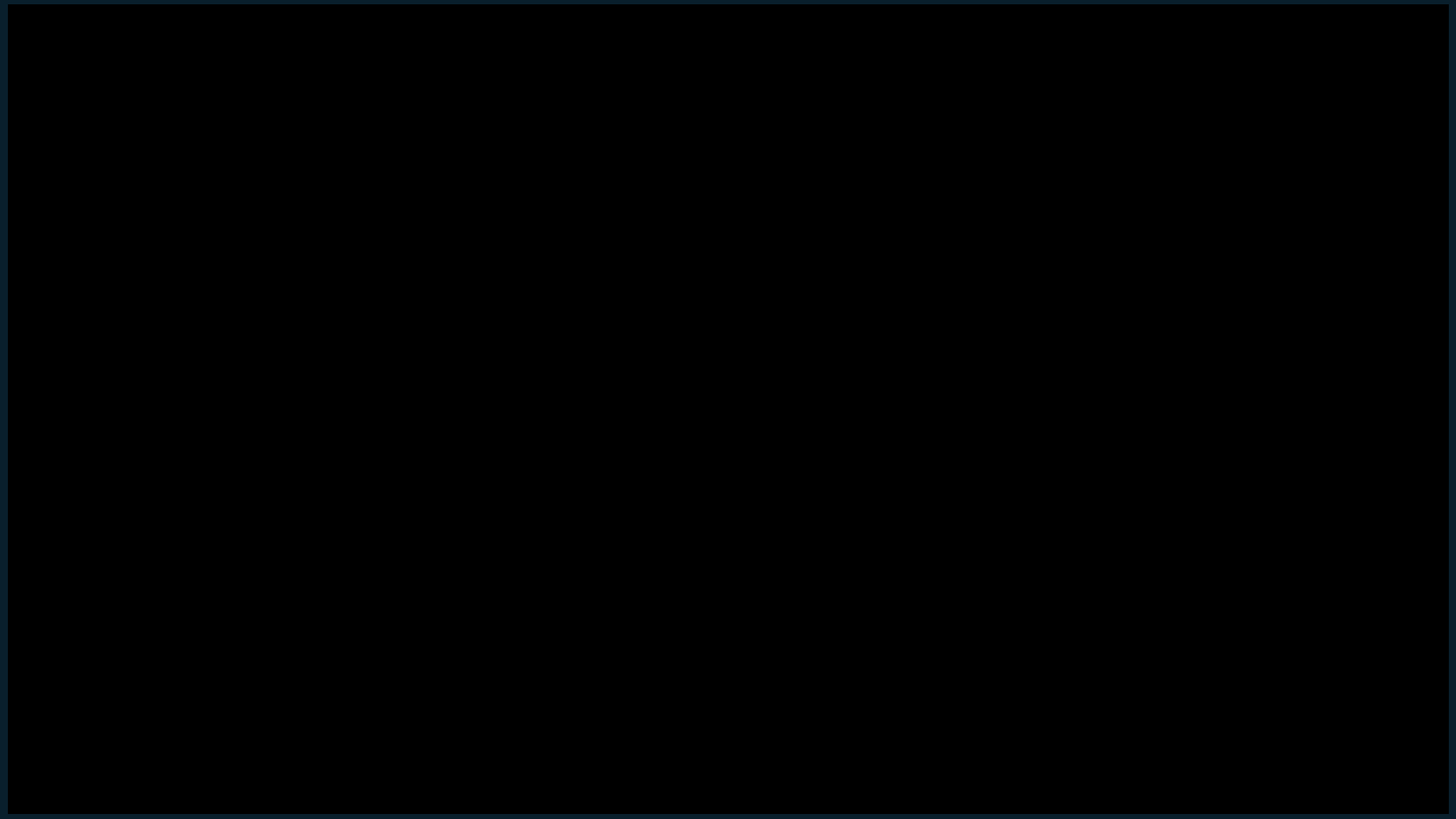
Use Case: Improved Communication



Use Case: Improved Communication

Pilot to create 30 high quality “softfakes” for
people who lost their ability to speak due to ALS

Use Case: Improved Communication




With great power
comes great
responsibility

What is Responsible AI?

Geebo @GeeboAds · Jan 12

More police warn of **AI voice scams**

By Greg Collier

AI voice spoofing refers to the use of artificial intelligence (**AI**) technology to imitate or replicate a person's **voice** in a way that may deceive listeners into thinking they are hearing the real person. This technology can be...
Show more

13

Apr 18, 2024 - Sports

Exclusive: Using AI, Steve Gleason creates art for first time since ALS diagnosis

Chelsea Brasted

Responsible AI Principles

Fairness

- Quality of service
- Allocation of resources and opportunities
- Minimization of stereotyping, demeaning, and erasing outputs

Reliability & Safety

- Reliability and safety guidance
- Failures and remediations
- Ongoing monitoring, feedback, and evaluation

Privacy & security

- Privacy Standard compliance
- Security Policy compliance

Inclusiveness

- Accessibility compliance (WCAG, legislation etc)

Accountability

- Impact Assessment
- Oversight of significant adverse impacts
- Fit for purpose
- Data governance and management
- Human oversight and control

Transparency

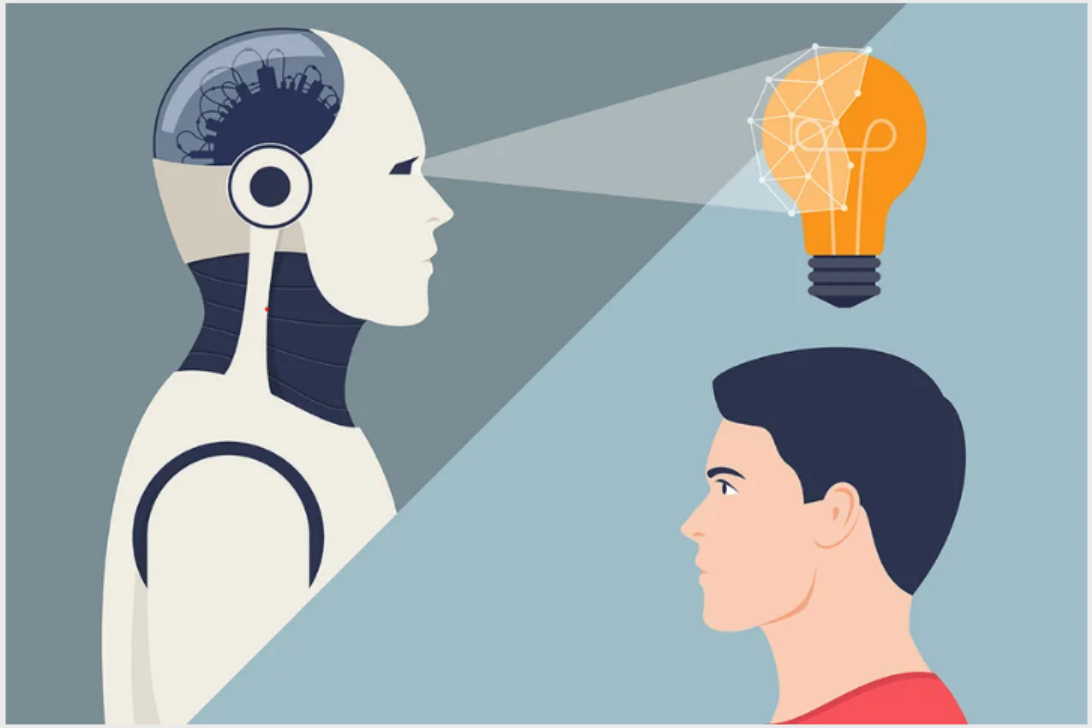
- System intelligibility for decision making
- Communication to stakeholders
- Disclosure of AI interaction

OCTOBER 26, 2023 | 6 MIN READ

Humans Absorb Bias from AI—And Keep It after They Stop Using the Algorithm

People may learn from and replicate the skewed perspective of an artificial intelligence algorithm, and they carry this bias beyond their interactions with the AI

BY LAUREN LEFFER



Maksim Akhramenka/Getty Images

ACTU

Un client malvoyant obtient 3000€ après l'expulsion de son chien-guide d'un Monoprix

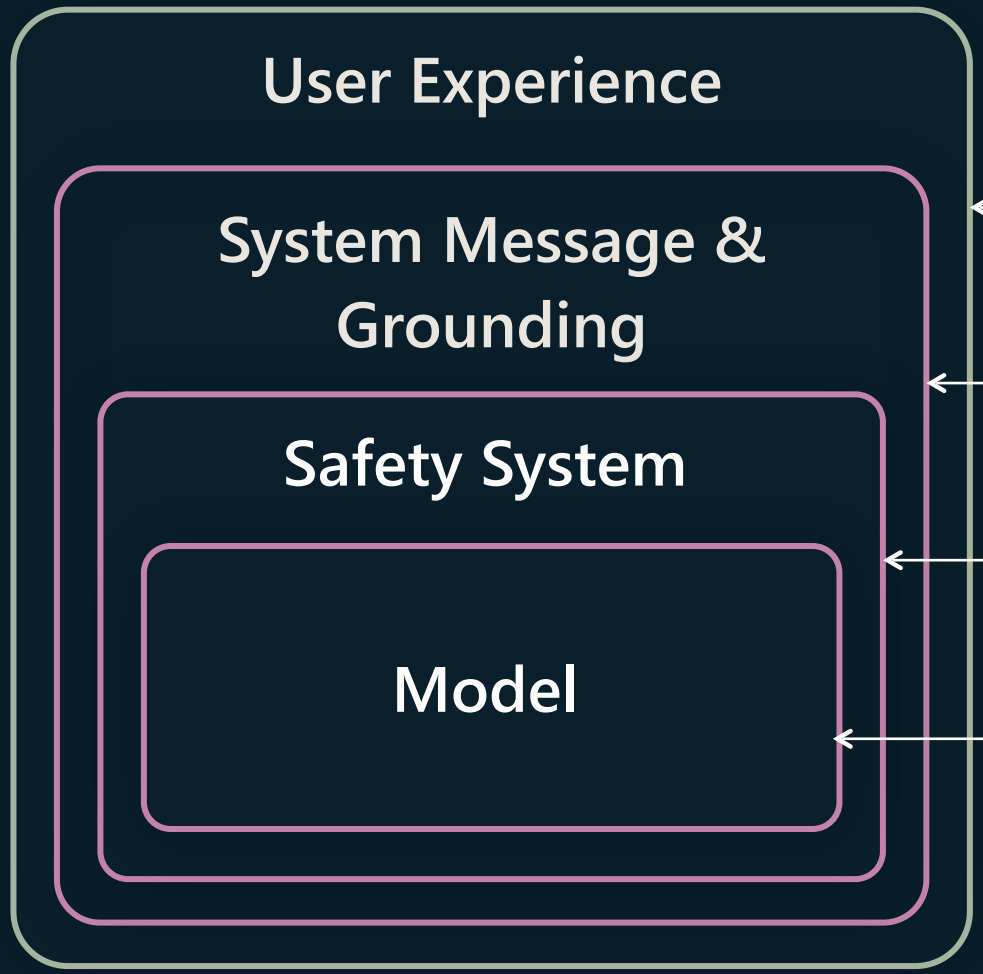
Un client malvoyant expulsé d'un Monoprix à cause de son chien-guide 🦮. Après 4 ans de bataille judiciaire ⚖️, le directeur du magasin est condamné pour discrimination. La formation des agents de sécurité sur les droits des personnes handicapées est cruciale pour éviter ce genre d'incident 🚨.

MICKAËL MINGEAU

8 octobre 2024 . 7:32 PM — 1 lecture min

Source: Humans Absorb Bias from AI--And Keep It after They Stop Using the Algorithm | Scientific American

Risk mitigation layers



Design for responsible human-AI interaction

Ground your model and direct its behavior
Steer model behavior toward trustworthy outputs with research-backed templates

Monitor and protect model inputs and outputs

Choose the right model for your use case

More about system messages on
Safety system messages - Azure OpenAI Service | Microsoft Learn

RAI Homework

Establish and implement RAI practices and governance

Involve people with disabilities in your full product cycle (including RAI)

Learn more on Empowering responsible AI practices | Microsoft AI

What’s the next (accessible) stop on our journey?

Trends and opportunities

Agents

What are opportunities to automate current non accessible experiences?

Generative UX

Sign language

Models for signs to text or text to sign

Policy and legislation

- EU AI Act
- European Accessibility Act
- US: 2024 over 400 AI bills proposed

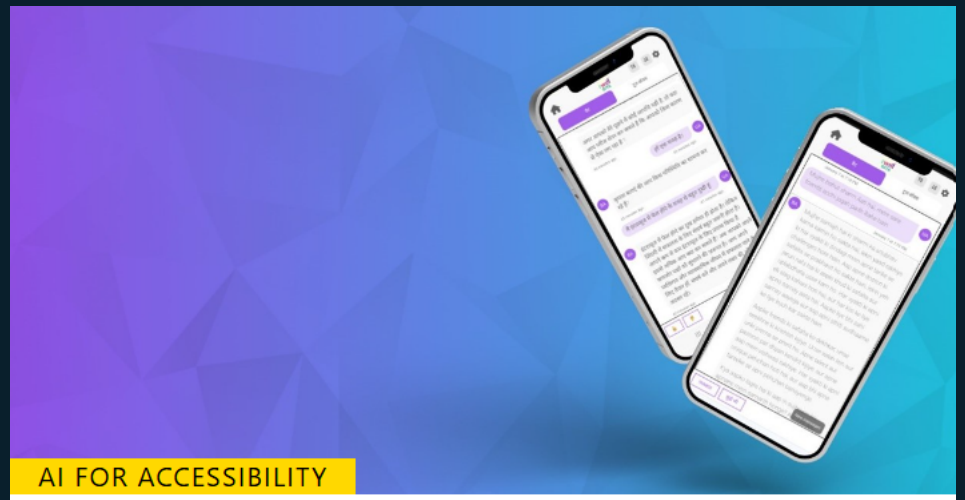
Innovation at the forefront

Cboard Breakthrough: Enhancing AAC Communication with AI-Powered Sentence Creation

Mon Oct 30 2023

Empowering Communication using artificial intelligence

Continue reading...



AI FOR ACCESSIBILITY

IWill GITA is leveraging Generative AI to expand mental healthcare

Joana Tanase | May 8, 2024

A secret innovation formula: aka.ms/InnovationToolkit

Step 1 – Connect with your passion

Step 2 – Identify the wave

Step 3 – Think about your customers

Step 4 – Craft a vision statement

Step 5 – Validate your prototype or solution

Here’s a few other things to get you started

Learn more about Accessibility at Microsoft

Microsoft.com/accessibility/resources

Get your Accessibility Fundamentals badge

aka.ms/AccessibilityFundamentals

Explore Copilot scenarios

aka.ms/ThisIsMyCopilot

Get tech support

aka.ms/eDAD

Thank you!